

THE CANADIAN ARCHITECT AND BUILDER

VOL. XVII.—No 3. TORONTO AND MONTREAL, CANADA, MARCH, 1904

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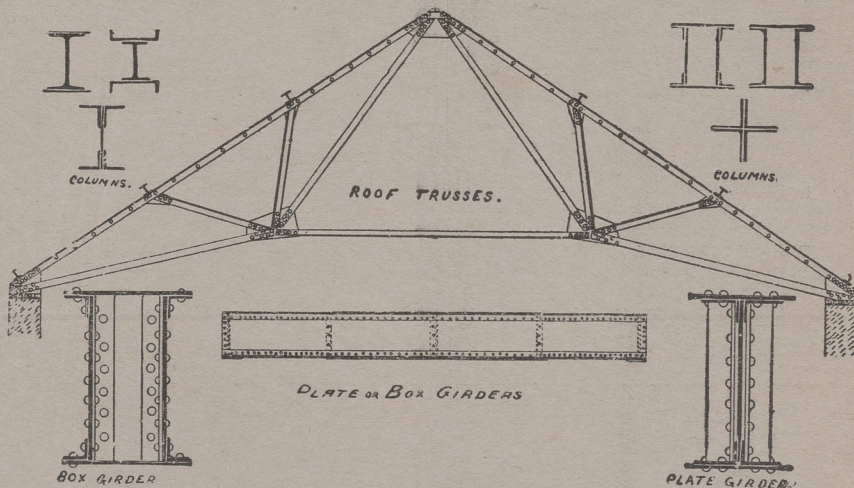
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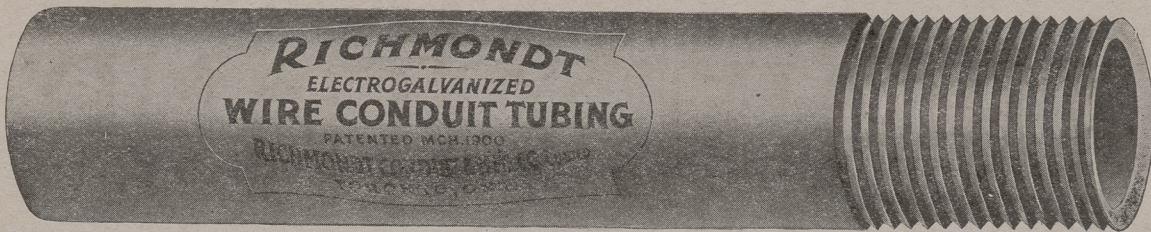
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The Canadian Architect and Builder

VOL. XVII.—NO. 195.

MARCH, 1904.

ILLUSTRATIONS ON SHEETS.

Bank of Montreal, Sydney, C. B.—A. T. Taylor, F.R.I.B.A., Architect.
House in Glen Road, Toronto.—Chadwick & Beckett, Architects.
Fire Station, Quebec.—Staveley & Staveley, Architects.
Miscellaneous Sketches.

ADDITIONAL ILLUSTRATIONS IN ARCHITECTS' EDITION.

Entrance, Woburn Cottage Hospital, for the Duke of Bedford.—H. P. Adams, Architect.
"The Gothic Room."—House in South Kensington.

ILLUSTRATIONS IN TEXT.

Portrait of the President of the Toronto Builders' Exchange.
Portrait of the 1st Vice-President, London Builders' Exchange.
Group Photograph, Toronto Builders' Exchange Annual Dinner.
Fidelity & Bond Building, Baltimore.
Illustrations accompanying article on Meditations in a Church.

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SPECIAL CONTRIBUTORS.

MR. W. A. LANGTON, Architect, London, Eng.
" EDMUND BURKE, " Toronto.
" S. H. TOWNSEND, " "
" Prof. Percy E. Nobbs, Montreal.
" FREDERICK G. TODD, Landscape Architect, Montreal
" W. H. ELLIOTT, Toronto.
" A. F. DUNLOP, R.C.A., Architect, Montreal.
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Uniform Building Laws. The International Society of State and Municipal Building Commissioners was recently organized in the city of Washington. One of the purposes of the Association is to secure a greater degree of uniformity in building regulations. The object is praiseworthy, and one that we hope to see achieved. The combined experience of a large number of cities in relation to the most satisfactory methods of constructing buildings, to ensure safety and reduce the fire risk should be embodied in a standard set of regulations that should govern the construction of important city buildings in the future.

Vancouver Warned.

A letter appears in the Vancouver papers over the signature of Mr. Henry Lye, a well known fire insurance adjuster, protesting against the proposed erection in the heart of the city of a wooden building of immense size, which must prove a source of danger to the more substantially built structures surrounding it. In 1886 Vancouver was laid in ruins by fire. Is a period of only seventeen years sufficient to efface the memory of such a catastrophe and destroy the lessons it should teach? While the adoption of the severest restrictions in force for the prevention of fire in metropolitan centres might be calculated to hinder the development of young cities like Vancouver, build-

ing in such cities ought nevertheless to be subject to reasonable restrictions. This especially applies to the business district, in order that none but buildings of substantial construction and appearance may be put up, and that the appearance of the principal thoroughfares may be pleasing and impressive and a barrier placed in the way of the spread of fire. A city of the size and importance of Vancouver ought to have build-restrictions of some kind, and any kind should be sufficient to prevent the erection of a fire trap in the centre of the business district.

The Water Supply of Toronto.

The property owners of Toronto have shown wisdom by voting in favor of the by-law submitted for their approval on the 23rd inst. to authorize the expenditure of a million dollars for improving the public water supply. The city has entirely outgrown the present system and from the standpoint of health as well as of fire protection, demands that the capacity of both pumping and distributing systems be largely extended. During the present winter the city was brought almost face to face with a water famine, and much destruction of property must have resulted if a serious fire had occurred during the time when there was but little pressure on the mains. There are some things a city may do without, but an abundant supply of pure water is an absolute necessity

and ought to be provided regardless of cost. A great mistake was made when a year or two ago the charge to consumers for water was cut in half. In consequence of this cut the revenues of the water department have since fallen short of the expenditures by more than \$75,000 per year. This deficit has to be made up by the property owners, who were therefore not as favorably disposed to vote the money now required for improvements as they would have been had the department remained on a self-sustaining basis. In view of the urgency of the case, however, it is gratifying to note that a broad view of the question was taken, and the authorities put in position to carry out the improvements.

The Building Outlook.

It is perhaps too early to speak with certainty regarding building enterprises likely to be undertaken during the season now opening. The information at hand, however, would indicate that taking into consideration all sections of the country, a fairly brisk season is in prospect. So far as can be learned it would appear that the numerous and serious labor difficulties which were a marked feature of last season and which reduced so materially the income of both contractors and workmen, are not likely to be repeated this year. Agreements have already been reached in some trades and it is to be hoped that soon after the first of April, all possible causes for disagreement will have been adjusted and removed out the way. In New York the plan has been introduced of dating wages agreements from the first of January instead of as heretofore from the first of May. A sufficient number of unions have already given their assent to the change of date to insure the success of the movement. The change is a most desirable one and must work to the advantage of all whose interests are in any way dependent on the prosperity of the building industry. The builders and building workmen of Canada should lose no time in adopting similar action, thereby getting rid of the uncertainty which in the past has usually prevailed at the opening of every building season. This uncertainty and the recollection of last year's experience may have something to do with the fact that so far contractors in Toronto have been asked to do but little tendering.

The tightness of the money market may to some extent have a retarding influence upon building this year, but speaking generally, the prospects point to a fairly active season in Toronto. In Hamilton a repetition of last year's activity seems certain, the leading architects' offices being crowded with work much earlier in the year than usual. The erection of the immense new factories of the Deering and Westinghouse Companies giving employment to thousands of skilled workmen, has created a large and immediate demand for moderate cost dwellings. Throughout western Ontario much building is said to be also in prospect. In Winnipeg and the West as well as in the Maritime Provinces all indications point to a record year for builders.

In the United States lower prices are expected to prevail. Mr. J. Knox Taylor, Supervising Architect, is quoted as saying that during the past few months there has been a drop in tenders amounting to upwards of 20 per cent. and he looks for still lower figures. He further states that there is now keen competition

for government work, while a year or so ago bids were comparatively few. In Canada prices for labor and materials are likely to correspond closely with those of last year. While the output of lumber will be considerably reduced, the slackening of demand from Great Britain and also from the United States, due to the disturbance to trade caused by the approaching Presidential election, will likely prove an effective offset to any advance in prices.

The Baltimore Fire.

Since the recent great fire Baltimore, more has been crowded with visitors, principally architects, contractors and experts. The architects have been looking for information, and many of them for commissions. The contractors are on the look-out for contracts, while the building experts, including many city architects and building inspectors, have visited the scene with the object of observing the effects of the conflagration upon the various kinds of building materials and methods of construction. One fact stands out prominently as the result of this fire, namely, that steel buildings when properly protected by fire-proof materials, such as porous cotta and reinforced concrete are able to withstand a severe fire. But for the fact that several steel structures stood in the way and blocked the progress of the fire, the public buildings and a large section of the residential district of Baltimore would have been destroyed. This fire has further emphasized the necessity of protecting by means of iron shutters, wired glass, or other equally effective methods, the windows of large buildings in the business centres of cities.

The Mayor of Baltimore has appointed a committee of citizens to advise concerning the reconstruction and improvement of the burned district. The existing building by-laws of the city will be carefully revised and remodelled before any new buildings are allowed to be erected. It is proposed that all new buildings over 100 feet in height shall be fire-proof throughout; that stores and warehouses more than two storeys high be equipped with fire-proof shutters on all windows not opening on a principal thoroughfare; that all outside walls shall be built of stone, brick, iron, or other non-combustible material, and that the roof sheathing shall not extend across front, rear, side, end or division walls. It is proposed to establish a municipal experimental testing department for the investigation of materials by the department and by builders and contractors.

BANK OF MONTREAL, SYDNEY, C.B.

The position of this building, illustrated in the present number, is in the centre portion of the town. It is built of freestone from the "Wallace" quarry in New Brunswick. The interior is cruciform, with piers carrying arches supporting the central dome, and is very spacious, lofty and light. The finishings and fittings are in oak, with old brass railings. The floors are marble mosaic in ornamental patterns. The general contractor was Mr. Reid, of Windsor, N.S., and the contractors for fittings were The Rhodes Curry Co., of Amherst, N.S., who all did their work very well. Mr. Andrew T. Taylor, F.R.I.B.A., of Montreal, was the architect, and Mr. Hopson, of Sydney, superintended the construction.

MEDITATIONS IN A CHURCH



A good old church always sets the eye to work measuring possibilities of application to modern conditions. The church I have been seeing for the last month is not at first sight at all suggestive of conditions in Canada. It is in the middle of a little nest of halls, two half timbered and one of Queen Anne brick; which all, beautiful in the first place, are made doubly so by being reflected in a series of fish ponds round which they are grouped. These buildings were the successive

redder stone than that of the body and are obviously additions to it. This evidence of piecemeal work may be encouraging for church builders who build for posterity; but, in addition to the fact that we are posterity and build for ourselves, it is not so very encouraging in view of the fact that, as completed, the ratio of seating accommodation to cost is such that it would cost a congregation somewhere between 800 and 1000 dollars a head to reproduce it in Canada. Nevertheless there is no repressing the suggestiveness of the plan—a single rectangle. It is both more spacious, more handsome, and more economical than any other form, when it is properly treated and of an area within reasonable limits, and both scale and treatment are so right at Gawsworth that, after admiring it on many occasions, I have thought it desirable to get it down on paper and here is the result:

The old body 40'.0" x 29'.0" continues to be the body of the church. The chancel, though of the same width, and nearly as long, 33'.8", was built only for honour and glory, partly of God and partly of the family of the Fyttons. Here, nearer heaven by one step than the common people, they used to sit, and here are their tombs, with an inscription on one which proclaims them "Fit on's to wear a heavenly diadem." The Fytton sare gone now. The last trace of them disappeared in marriage with Lord Mohun and it was for her inheritance, this very Gawsworth, that Lord Mohun fought with Duke Hamilton, as recorded by Thackeray in *Esmond*. Their tombs and their sixteen quarterings in painted marble remain, and make one wish that this kind of feature (fig. 2) could be repeated in Canada. Nothing seems to sanctify a church so much as these relics of vanity; at least when there are recumbent figures upon them, (good recumbent figures,) to make one feel the presence of the dead among the living. And when, as in this case, the monuments remain in all their dignity while the family is gone

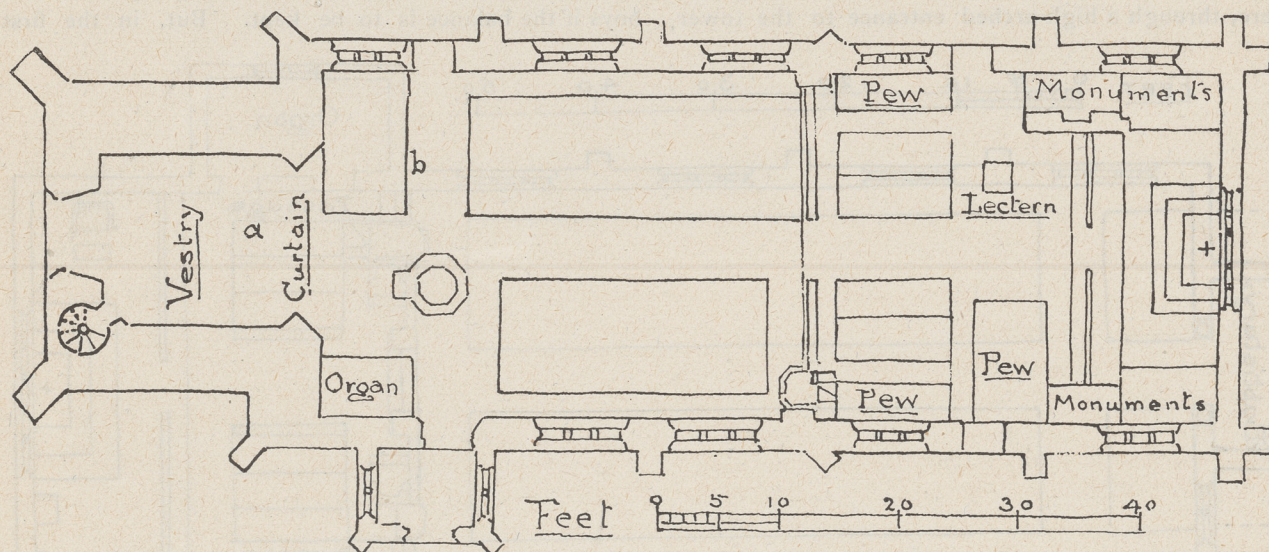


FIG. 1.—PLAN OF GAWSWORTH CHURCH.

residences of the head of the family which built the church. They did not do it all at once, as is evident not only from the appearance of the stone but from the structure of the church. The portion marked off by corner buttresses was built first; it most likely had a small chancel proceeding from the east side, of less width than the body, but it had neither the present chancel nor the present tower which are both built of a

forever, it becomes a case of sermons in stones, of building better than the builders knew; for the monuments which were ordained to perpetuate family honour point also to its evanescence. There is evidently something to be said for monuments, but most, I think, for life sized figures; recumbent figures, I should say; in marble; in painted marble.

The great thing, however, is to get the church built.



FIG. 2.—MONUMENTS TO FYTTONS.

The plan in fig. 3 is a study of its possibility. As far as the general proportion goes, an internal view of the existing church is most satisfactory from the extreme west, i.e., standing at the entrance under the tower, where, through a high arched entrance to the tower,

the whole length of the roof is to be seen. A suggestion of the view is given in fig. 4 from a photo taken from the point marked a, under the tower. The camera is not as inclusive as the eye and it was not possible to get in either the same extent of roof that is seen by the eye or, what is the great beauty of the view, the windows along the sides. The photograph was taken to serve as a sort of sectional view, showing the relation between the span and the height of the wall. This is exactly satisfactory in proportion to the length from west to east, and these dimensions—92'.0" length, 29'.0" width, and 23'.0" wall height—would make a well proportioned single chamber church as laid down in fig. 3—which is like some aisled churches with the aisles omitted.

The side passages 2'.2" and the centre 5'.0" are quite enough; the seats seem to want a few inches in length to make them take six persons of moderate size with ease. An exact width would be 30'.3" and the other dimensions may be safely increased in proportion.

For hearing, the total length is not too great for the familiar words spoken from the altar, where the speaker has also the advantage of having a wall close behind him. The greatest distance for ease in speaking from the pulpit would be, as far as one can judge by the eye in the church, the distance from the east wall to b, on the passage from the north side door. This distance may then be transferred to the new plan as the distance of the chancel screen from the west end. The length thus left for the chancel is about right and the width, allowing for return passages for communicants, is no more than is necessary for good arrangement on the pulpit side, for the reading desk should range with the men rather than with the boys. The lectern may repeat the pulpit on the other side and there will thus be a mask to both hind seats and a similar motive in plan at the ends of the screen.

The three seat arrangement of the choir requires some defence as it may lead to mixing up men and boys if the balance is to be kept. But, in the first

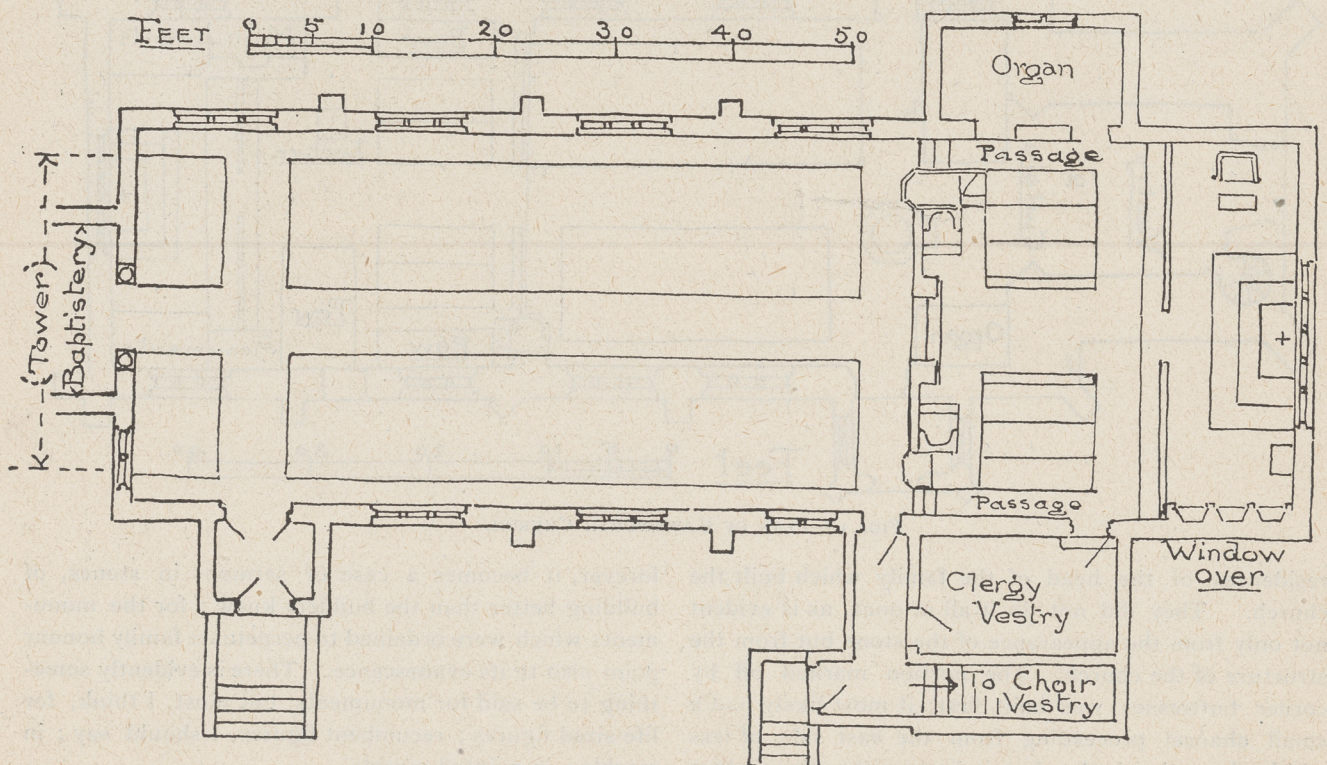


FIG. 3. SKETCH FOR DERIVED CHURCH.

place, alto boys are usually too tall for the boys' row and had better sit with the men; and secondly, the back seats are not likely to be filled except on festivals. The two front seats on each side, which would mean 10 men and 14 boys, would be enough for ordinary use.

The three seat arrangement is otherwise an advantage in reducing the depth of the chancel. It will permit the allowance of due spaciousness at the east end.

There ought to be no suspicion of narrowness in

in the latter, which costs nothing, deep reveals seem necessary; and these are the natural result of the hollow walls which are the churchwarden's friend and the coal dealer's enemy. As for the roof, it is not impossible to give a roof architectural character without great cost, but we are not so confident as formerly that this can be done merely by displaying its architectural essence. The real truth is that an acceptable open timber roof is acceptable only from its superfluity. The



FIG. 4.—VIEW LOOKING EAST.

front of the communion rail or within it, and abundant room must be left for this.

The depth thus given to the choir is one bay of the roof; and the walls of the organ chamber and vestry take the place of buttresses. To make the vestry gable not wider than a bay, the church can be entered under a long slope masked by a gabled porch.

Here then is a church seating 250 and, if one can rust study from a model different enough to make some guessing necessary, both convenient and economical; that is to say, as far as the latter point is concerned, the walling is simple and dignity may depend merely on roof and windows. Apart from proportion

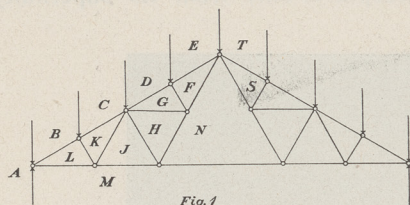
gothic revivalists who displayed scientific trussing have left roofs that are anything but acceptable. The safest bottom idea to have is continuity of surface. Vaulted roofs and such perpendicular roofs as that of Grawsworth are one in this respect, and indeed an open roof with trusses four times as many as is necessary or four times as heavy as is necessary is not far removed from the same feeling. If pitched rather than flat, crossed by heavy construction members and recessed or double recessed, its continuity is still the leading idea if the nature of the transverse supports is not entirely revealed and the attention directed to them. I would then try this as a way—a way for which wood and plaster would suffice—to accomplish for this church a roof that would be both dignified and economical.

W. A. LANGTON.

A GRAPHICAL SOLUTION OF THE FINK ROOF TRUSS.

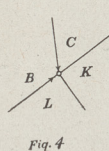
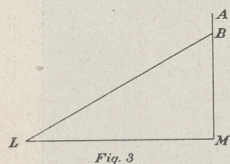
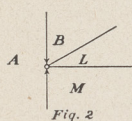
By PROF. C. H. WRIGHT, of the School of Practical Science, Toronto.

Let the annexed diagram Fig. 1, represent a Fink roof truss supporting the loads AB, BC, CD, DE, etc., and let the reaction of the left wall be MA. Consider first the forces acting on the point ABLM. There are two



known forces MA and AB and two unknown, BL and ML, exerted by the members BL & ML on the point as in Fig. 2.

From any point M, Fig. 3, draw the lines MA and AB to represent the wall reaction MA and the load AB.

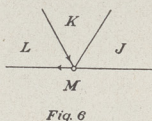
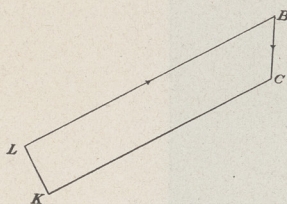


Through B and M draw the lines BL and ML parallel to the directions of the forces BL and ML.

Let these lines intersect in L. Then MABLM is the vector diagram for the point, and the lengths of BL and LM represent the magnitudes of the forces BL and LM acting on the point—the force BL being a push and LM a pull, hence the member BL is in compression and LM in tension.

Proceeding to the point BCKL the known forces acting are LB and BC, and the unknown CK and KL as in Fig. 4.

From any point L Fig. 5, draw the line LB parallel to the force LB and from it cut off the length LB to re-



present the magnitude of the force and from B draw BC to represent the force BC.

Through C draw CK parallel to the force CK and through L draw LK parallel to the force LK intersecting CK in the point K.

Then LBCKL is the vector diagram for the point and CK and KL represent the forces CK and KL. These are both pushes on the point, and therefore the members CK and KL are both in compression.

Considering the forces acting on the point JKLM there are two known forces ML and LK and two unknown KJ and JM as in Fig. 6.

The vector diagram being MLKJM fig. 7, where KJ and JM represent the forces KJ and JM. As they are both pulls on the point the members KJ-JM are in tension.

Now examine the conditions existing at the point

DEFG. There is one known force DE and three unknown, viz.—EF, FG and GD as indicated in fig. 8.

Two of these forces DG and EF act in the same direction and will have a resultant acting in this same direction. For these two forces substitute their

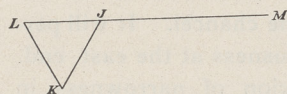


Fig. 7

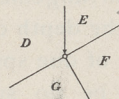


Fig. 8

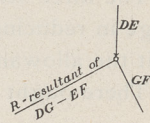


Fig. 9

resultant and the forces acting on the point are DE, GF and the resultant of DG and EF or R, fig. 9.

Draw the vector diagram (fig. 10) for these three forces and the lines DE, GF and R will represent the force DE, GF and R, and as GF is a push on the point the member GF is in compression.

At the point FGHN there are four forces acting, one of

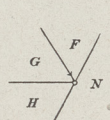


Fig. 10

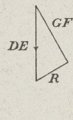


Fig. 11

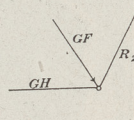


Fig. 12

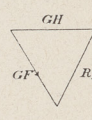


Fig. 13

which FG is known and the other FN, HN and HG are unknown and act as in fig. 11.

Of the unknown forces FN and NH act in the same direction and will have a resultant acting in that direction. Substituting this resultant for the two forces

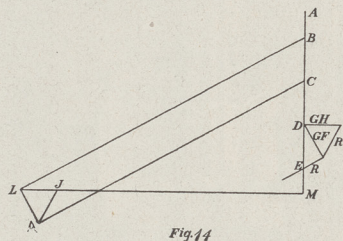


Fig. 14

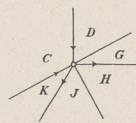


Fig. 15

and the set of forces becomes GF, GH and R2 (Resultant of FN and NH) fig. 12.

Draw the vector diagram GF, and GH and R2, fig. 13,

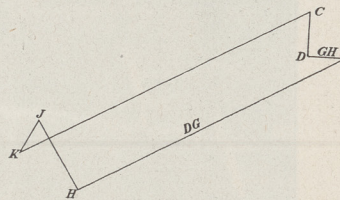


Fig. 16

and the length of the line GH gives the magnitude of the tension in the member GH.

Combine these four vector diagrams in one (fig. 14)

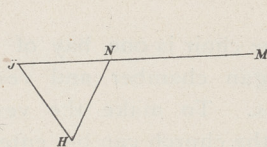


Fig. 17

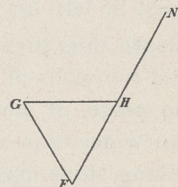
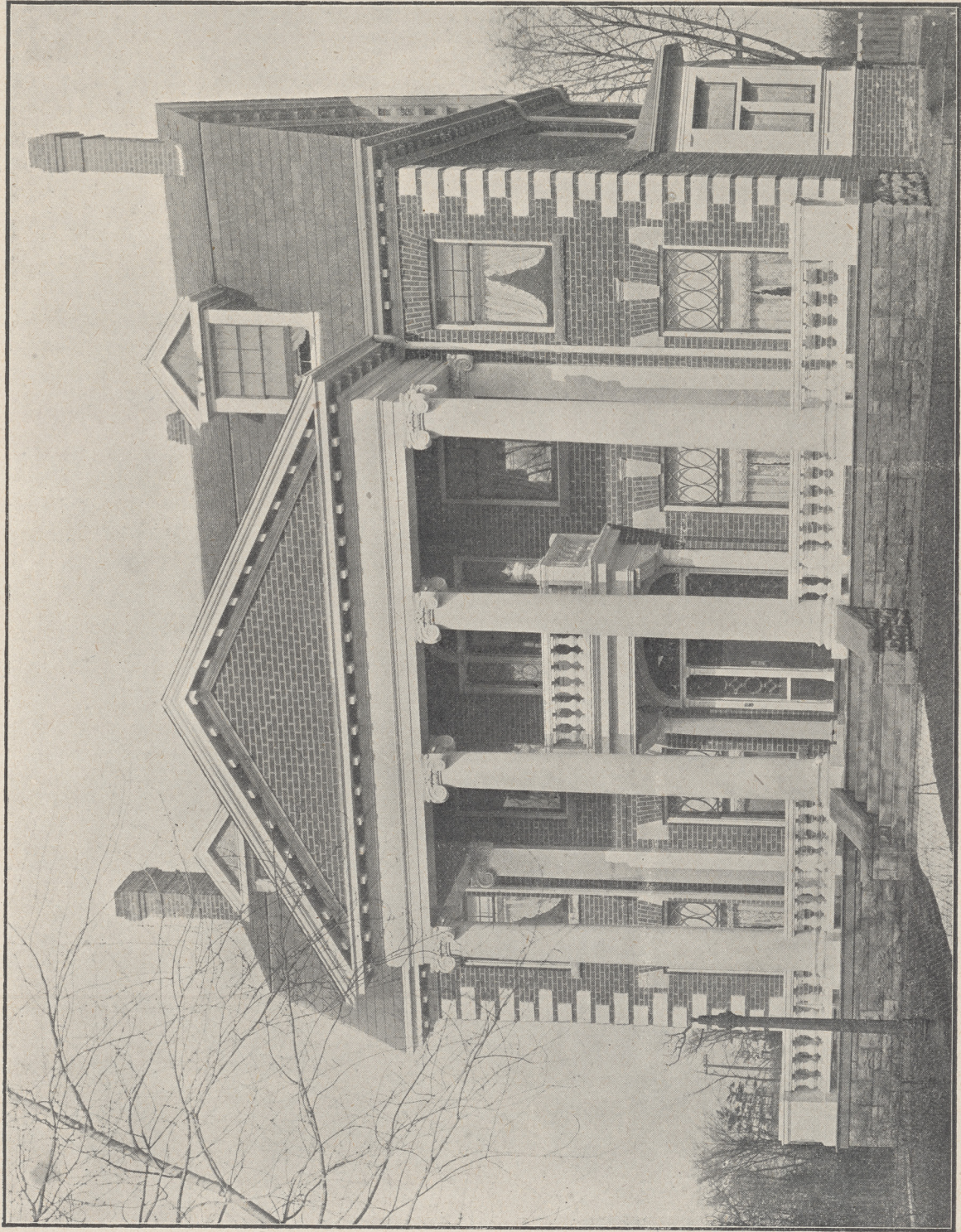
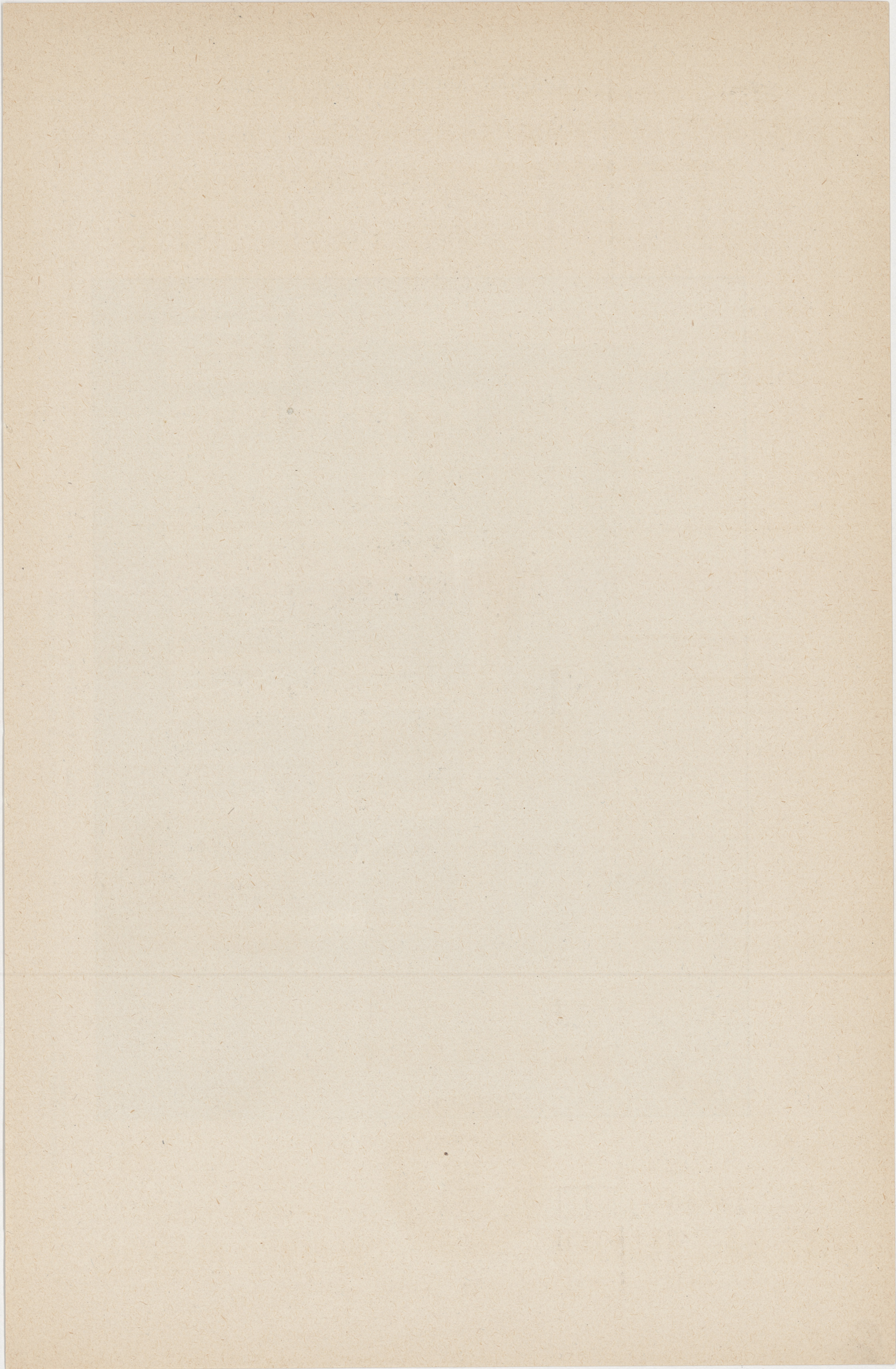


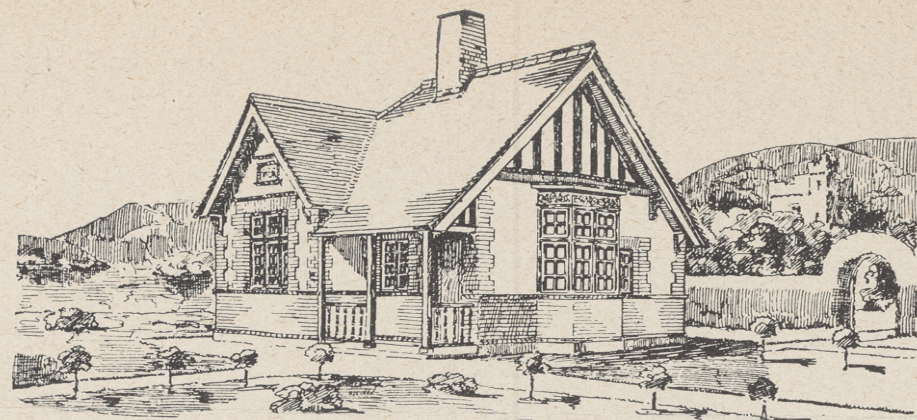
Fig. 18

The annexed diagram Fig. 15 represents the condition existing at the point CDGHJK. There are two unknown forces DG and HJ. Draw the vector diagram

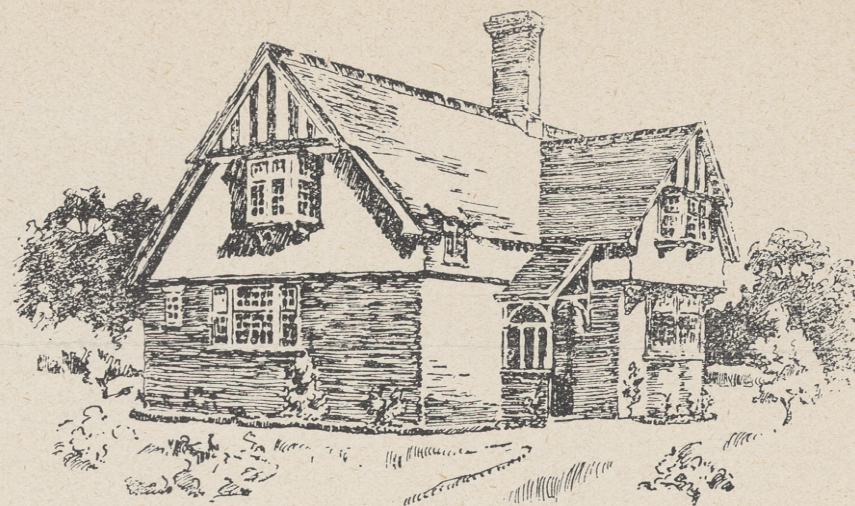


HOUSE IN GLEN ROAD, TORONTO.
CHADWICK & BECKETT, ARCHITECTS.





GATE LODGE AT BEAUPARC, CO. MEATH, IRELAND. ANTHONY SCOTT & SON, ARCHITECTS.



CANADIAN ARCHITECT AND BUILDER.



ELEVATION FOR A VILLA, FT. FRONTAGE, TO BE BUILT IN STONE AND CONCRETE OR BRICK.



AT KENTWELL, ENG.



A FARM HOUSE, STANTON, ENG.



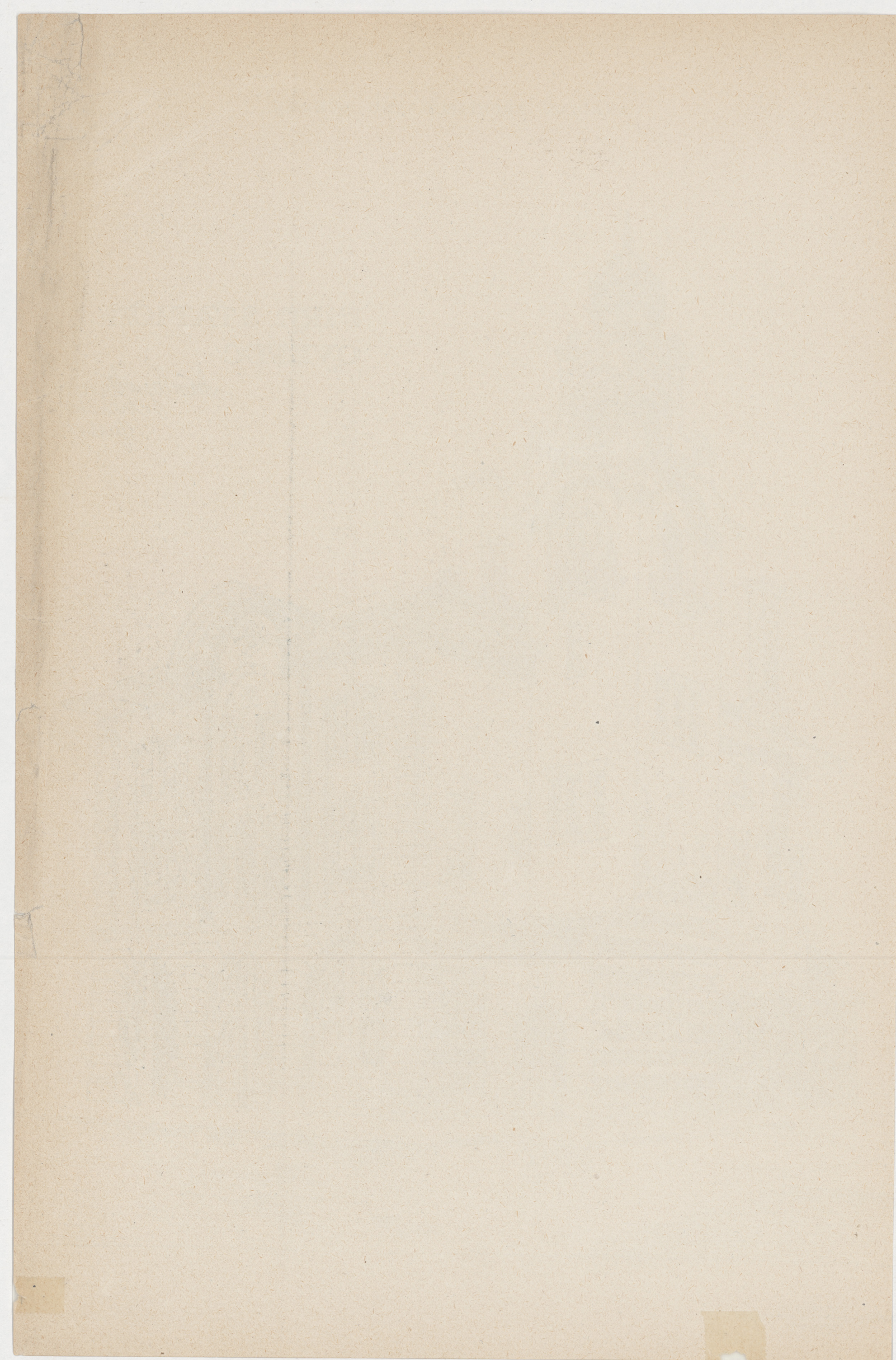
FRENCH BAY WINDOW INTERIOR.

MISCELLANEOUS SKETCHES.

FIRE STATION
QUEBEC

*Staveland & Staveland
Architects
Quebec*







SUPPLEMENT TO
CANADIAN ARCHITECT AND BUILDER
MARCH, 1904

BANK OF MONTREAL, SYDNEY, C.B.
A. T. TAYLOR, F.R.I.B.A., ARCHITECT.

J, K, C, D, GH, DG, H, J, fig. 16, and the length of DG and HJ will give the magnitude of the unknown forces.

The vector diagrams for the points MJHN, NHGFV,

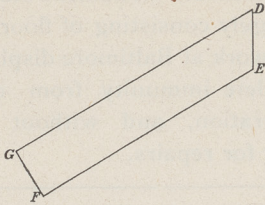


Fig. 19

and DEFG are given in figs. 17, 18 and 19 respectively.

Adding these four vector diagrams completes the combined diagram as in fig. 20.

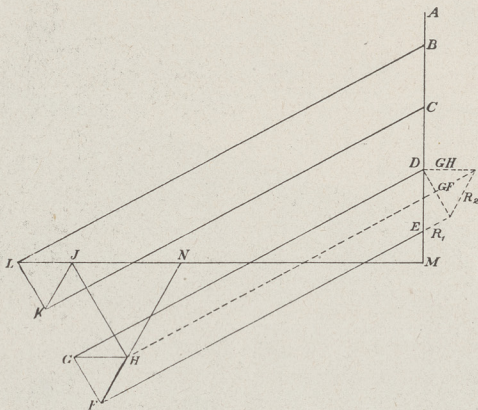


Fig. 20

Suppose the loads AB, BC, CD, DE and ET are unequal, that their total is equal to the load on the

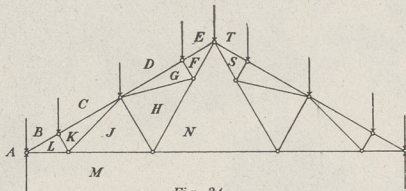


Fig. 21

right hand principal and that the lengths of the members BL, CK, DG, and EF are unequal as in fig. 21.

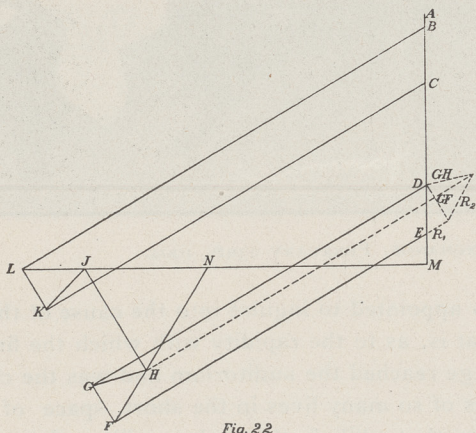


Fig. 22

Proceed as in the above problem and construct the vector diagram fig. 22.

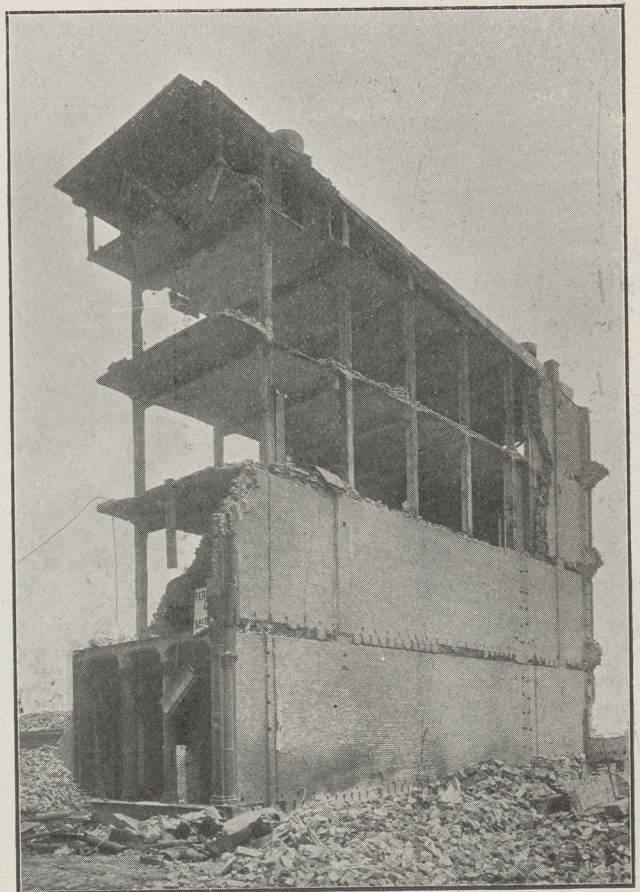
The work of excavating the Roman remains at Silchester, in Hampshire, (England), has been productive of valuable results. A number of tessellated floors have been unearthed, while a magnificent section of mosaic pavement, with a figure representing a dolphin, in a remarkable state of preservation, and over 1,000 pots and vessels, of varying sizes and shapes, have been brought to light.

SOME COMMENTS ON THE BALTIMORE FIRE.

BY A VISITOR TO THE SCENE.

Huge heaps of debris, entire streets of them, and amidst this desolate vista of broken brick or stone an occasional steel-frame structure, standing sentinel-like, over the scene of the disaster. Such is the scene left by Baltimore's recent fire and giving to Engineer and Architect the injunction. "look here upon this picture and on this." The brick rubbish is all that remains of the acres of non-fireproof buildings.

One good service was done by the wholesale conflagration in supplying owners and designers with the strongest sort of proof that modern fire-resisting practice was based on true theory. The fire-proofed building, about which many professed scepticism, has fully vindicated itself.



THE FIDELITY & BOND BUILDING, BALTIMORE.

The intensity of the heat at Baltimore is indicated by the thoroughness with which everything combustible was licked up—hardwood flooring, door and window trim, and interior fittings. While this was the case, the efforts to protect the structural steel framing are seen to have been mainly successful, and most of the steel work is as good as ever and the walls only need superficial repairs.

The buildings with concrete fire-proofing, without exception, have passed through the fiery ordeal showing a wonderful state of preservation, under the most severe conditions.

A striking case is that of the Commercial & Farmers' National Bank, where the upper floors of the building were of mill construction and the floor over the bank was the only one fireproofed. It was a concrete floor and all the debris of falling walls, safes, etc., landed on it, but according to "Iron Age" it was absolute-

ly uninjured, while all above, including the roof, was completely ruined. Another building, the National Bank of Commerce, had all the wood-work burned out of it, but the concrete floors are absolutely intact. The writer saw a large safe being moved across the concrete floor. The banking house of Alex. Brown & Sons is another example, with floors and roof included, of expanded metal and concrete fireproofing. The military cordon and debris strewn street alone prevented this institution from opening for business the morning after the fire.

A most remarkable example of the fireproofing qualities of concrete is exhibited in a four storey structure now known as the "Concrete Building",

the concrete is intact and as good as when first installed. The buildings on all sides of it were levelled to the ground and the brick walls of the building itself crumbled and fell away. The cast iron front failed also, and to-day this concrete monument stands, a paradox of a building largely consisting of floors without walls.

The concrete work at Baltimore displays an unbroken record of complete immunity from damage by the general conflagration, and without exception will not cost a dollar for repairs.

THE CHICAGO THEATRE FIRE.

On this subject Mr. Chas. Baillairge, Architect, of Quebec, writes:—"I see by the report of the Commis-



ANNUAL BANQUET OF THE TORONTO BUILDERS' EXCHANGE, FEBRUARY 23RD, 1904.

which prior to the fire was the office of the U.S. Fidelity & Bond Co. We publish a view of this building showing its unique appearance. It is built of steel-reinforced concrete floors, roof, beams, and columns. In erecting the building, party walls belonging to adjoining buildings were used instead of building new walls, and in order to carry the floors pilasters of concrete re-inforced with steel rods were built up against the walls, and on these were carried the beams, also of concrete and steel rods. The beams are about 22 feet long, spaced about 10 feet apart. The floor slab is of reinforced cinder concrete, about 5" thick. There is no structural steel in the building, so that there can be no warping of heavy metal framework. Although the brick walls and iron front succumbed, as well as everything combustible,

sioners appointed to inquire into the cause of the disaster, that is, as to the rapidity with which the fire from the stage reached the auditorium and was the cause of the loss of so many lives in the short space of a few minutes, that while in the roof or ceiling of the auditorium there was an open ventilator, a skylight which on the roof over the stage end of the building should have been open, was on the contrary hermetically closed.

"Now, say the Commissioners, all the smoke and heated gases, which, had this skylight been open, would have passed out direct through opening, had to seek issue by the ventilator over the auditorium, thus creating a current of air which prevented the lowering of the incombustible curtain which, with the wall separating the auditorium from the stage, was intended to

cut off all communication between the two in case of fire.

This current of smoke and heated gases, which, had the stage ventilator been open, would have passed out directly through that issue, being prevented from so doing, rushed through the proscenium arch or opening with such rapidity and force that it pressed the curtain so tightly against the groove or sides in which the curtain was intended to work, that it could not be got down lower than within 14 ft. of the stage floor.

Thus the fumes and gases asphyxiated the audience and in a very few minutes; those in the galleries or upper tiers being, of course, the first victims of the disaster.

The Commissioners insist forcibly and are right, in doing so, that the stage sky-light or ventilator should have been open during the performance, and that had it been opened and the gases enabled to escape in that direction, there would have been no such a current of air towards the auditorium as to prevent the lowering of the fire-proof curtain, and probably no loss of life at all on the auditorium side of the cut-fire wall between the auditorium and the stage end portions of the building, would have occurred.

This should be noted and immediately acted on by the managers of our Quebec so called Auditorium, though it is only the audience side of the structure that can be properly so called.

A ventilator over the stage can easily be made of proper dimensions and at trifling expense, which while allowing the fumes and heated gases to pass out, would exclude rain and snow, etc.

True, there are the so called emergency doors—five of



MR. R. G. KIRBY,
President Toronto Builders' Exchange.

them on the eastern and four on the western side of the building, with iron staircases leading from them to ground level; but in such a climate as this, the landings of these outer stair-ways might, in the case of a heavy fall of snow, become impeded during a single sitting or representation and the outward opening of the emergency doors be thus prevented.

There should be a lad at each door with strict orders not to leave his post during the performance; for at the Paris Charity Bazaar fire, there were seven emergency doors, but no one having been stationed at them

to open them, when the explosion of the acetylene apparatus of the cinematograph occurred, the audience from the far ends of the bazaar building (300 ft. in length) had to travel 150 ft. to reach the central door by which they had entered, not being aware of the existence of the emergency doors.

Had these doors been opened in time all would have escaped, with scorched heads and shoulders, no doubt from the falling draperies but with their lives at any rate, and three months would have repaired all such sores and singings as were caused by the burning hangings falling from above.



MR. GEO. C. YOUNG,
1st Vice-President London Builders' Exchange.

The only really safe theatre of more than one story in height, as at the Somner Park, Montreal, which is open all around and allows of immediate escape on all sides, may be said to be at Antwerp, Bruxelles, erected according to the system proposed by the undersigned in 1884 and exhibited in Paris in 1900. In this theatre there are five tiers of inside galleries one over the other, with corresponding iron balconies surrounding the auditorium end of the building on the outside. To each tier of superposed boxes or galleries there are 25 doors—125 in all—opening onto the outer balconies, with iron staircases descending from the one to the other to ground level. But even with all these precautions, the stage ventilator recommended by the Chicago Commissioners and the keeping of it open during each performance, would be none too much of a safe-guard against the possibility of the stage fireproof curtain being out of order.

When the undersigned built the Quebec Academy of Music in 1854, he had designed to have an iron cut-fire curtain (asbestos being then unknown) and the iron covered on the auditorium side with mirror in vertical strips of some 3 ft. in width, with silver-edged bars between them to keep the glass in position; but funds were lacking to carry out the scheme, and though the mirror was imported for the purpose, the rigid iron curtain was never made.

CHAS. BAILLAIRGE, Architect.

QUEBEC, March 18, 1904.

PUBLICATIONS.

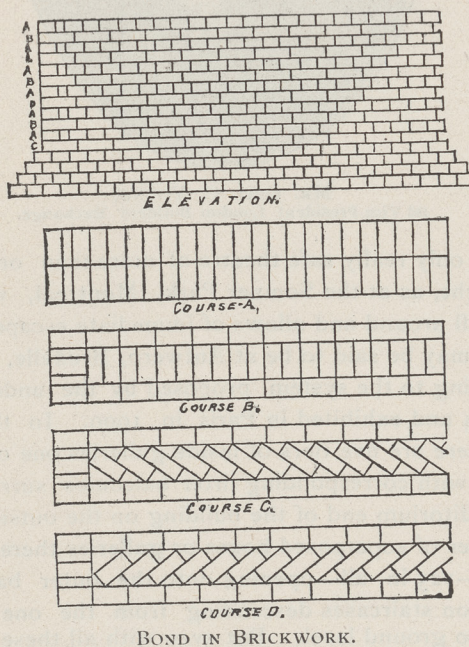
One of the latest additions to the rapidly growing literature on the use of cement for constructional purposes is a book of 200 pages, entitled "The Architects' and Engineers' Hand Book of Re-Inforced Concrete Constructions," by L. J. Mensch, C.E., published by Wm. Seavert, Chicago, price \$2.00. It treats of the use of concrete for a great variety of purposes, giving results of tests and illustrations showing important works which have been carried out in this material.

INTERCOMMUNICATION.

[Communications sent to this department must be addressed to the editor with the name and address of the sender attached not necessarily for publication. The editor does not hold himself responsible for the expressions or opinions of correspondents, but will, nevertheless, endeavor to secure correct replies to queries sent in. We do not guarantee answers to all queries neither do we undertake to answer questions in issue following their appearance.]

From Young Mason:—You were so kind as to answer the last question I asked you, that I am emboldened to still further trespass on your good nature and ask for further information. 1. What pressure will good brickwork stand, in piers and other work, without crushing? 2. Is mortar, as generally used, as strong as the brickwork? 3. What bond in brickwork is considered the strongest? Information on these points will be greatly appreciated.

ANS.—1. A brick of average quality requires a pressure of from 600 to 2,000 lbs. and upwards per square inch to crush it, the figures varying in different descriptions of bricks, and being as high as 4,395 lbs. in hard burnt facing bricks. Brick walls and brick piers, if properly built, will bear very heavy weights, as will be seen from these figures. The strength of a wall is not dependent, however, upon the strength of its brick alone, but upon three distinct conditions: (a) the manner in which the bricks are arranged; (b) the strength



of the mortar and (c) the strength of the bricks. Each condition is of considerable moment, and, considering that brickwork is rarely weighted with a load even approaching one tithe of crushing weight, it is obvious that the first and second conditions are of the greatest importance.

2. The object of mortar in a wall is simply to form an adhesive material between the bricks of which the wall is composed. It has no function beyond that. Good mortar is certainly not so strong as good brick, and the mortar joints should, therefore, be kept as thin as is consistent with the perfect adhesion of the bricks. The current customs of making thick mortar joints has the effect of considerably weakening the brickwork and should be discouraged.

3. One of the strongest forms of bonding in brick walls is that known as "English bond", in which the bricks are arranged in alternate courses of headers and stretchers. The small amount of cutting required, the

avoidance of two vertical joints over one another, and the large number of headers in the wall render it very strong and suitable for heavy work, in fact, English bond, if properly carried out, conforms very nearly indeed, to all the requirements of bonding.

In thick walls of heavy buildings, such as warehouses and structures of the same class, the strength of the bond may be improved, to some extent, by arranging every fourth course of bricks diagonally, forming what is sometimes termed "diagonal bond." The advantage is that a lap of four instead of two inches is obtained. The elevation of this bond is the same as that of ordinary English bond as will be seen from the engraving. The header courses are the ordinary header courses of English bond arranged alternately with stretcher and diagonal courses. The diagonal courses are arranged alternately in opposite directions. One disadvantage of this arrangement of the bricks at an angle is the fact of it leaving small triangular spaces on each side which tend, to some extent, to weaken the wall. These spaces should, however, be carefully filled in with pieces of brick and not be allowed to be left simply filled in with mortar.

It often happens in the construction of brick buildings that the necessity arises to form a wall of the greatest possible strength with the smallest amount of materials. This will occur when very high buildings are centered up, on one or more sides, on to piers, as in the case of the many large structures erected on any of the principal streets of Toronto or Montreal, where the lower portion of the building is designed for store and every inch of space is valuable. The most economical form of wall, or pier, for such a purpose would be the diagonal bond shown in the engraving, and if it were carried out with the best hard bricks and good cement mortar, it would probably form the strongest brick wall that could be built. To further increase the strength, hoop iron bond should be used, being laid one tier in every fourth course in height and one row to every half a brick in the thickness of the wall. The iron should be prevented from oxidation preferably by dipping into tar, be roughed or jagged at the edges to form a grip on to the cement and be lap-jointed and riveted at all angles.

From Carpenter:—I would like some information as to the best method of fastening base-boards around the angles of a brick chimney. Is it best to "plug" the wall to nail to, or will the mortar be sufficiently strong to grip the nails so they will hold the base snug and tight against the brickwork? Any "pointers" on this subject will be thankfully accepted.

ANS.:—"Plugging" the wall is generally necessary for fixing base to a chimney breast, as usually no other device is provided. When the brick work is good and the flues properly pargetted, two or three small plugs may be driven in the wall without incurring any risk of fire, but care must be taken not to have the plugs too long. Probably the best method is to drive the plugs into the horizontal joints round the chimney breast, if the joints are situated conveniently, because these joints are of solid mortar right through, and there is no danger, therefore of driving the mortar out from the other side, and so leaving the inner ends of the plug exposed to the heat of the chimney. But vertical joints are often not solid, but are merely flushed up on

each side; and therefore, a plug driven into a vertical joint is liable to displace the mortar on the inside and force off a piece of the pargetting also. A good method of preparing for the base is shown in Fig. 1 where the grounds are dovetailed at the angles and nailed to plugs, fillets being nailed round the bottom; between the grounds and fillets vertical blocks are secured. The internal angles of the base are grooved and

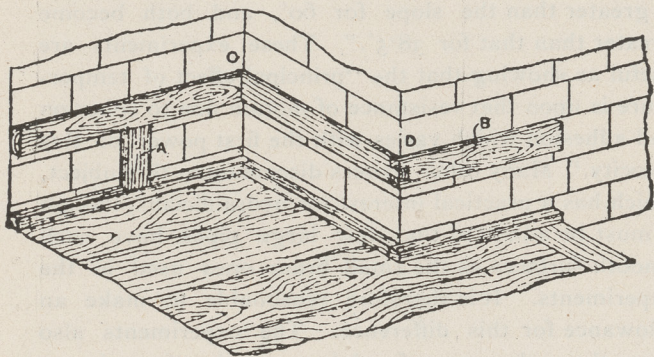


FIG. 1.

tongued together, and the mouldings scribed as shown at Fig. 2. Where work is properly put together in this manner the chimney breast requires very little plugging. In the case shown in Fig. 1, the plug would be ample, and we have often seen one plug only employed to fix the front ground B, because the joints C and D may be nailed together before fixing. In good, ordinary house work all that is necessary is to drive

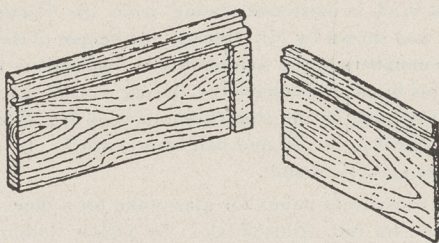


FIG. 2.

the plugs in, cut them off flush to the wall, and to these plugs fix the vertical blocks to which the base is nailed.

Fig. 3 shows the base in its finished condition. It will be seen at Fig. 2, which shows the internal angle O Fig. 1, that the moulding is "coped" and that a

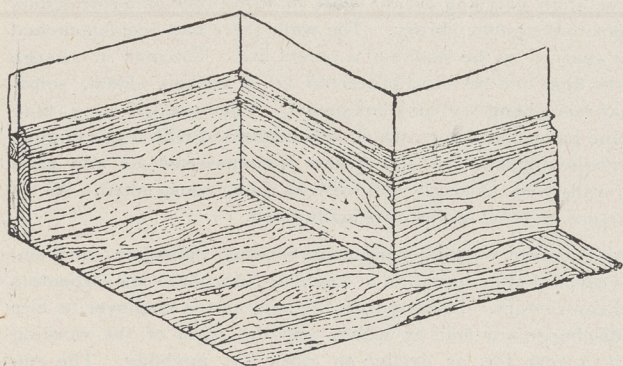


FIG. 3.

tenon is left on the "coped" piece which is driven into a dado groove as shown. This makes good work when properly done, but, of course takes time. The slovenly manner now in vogue of nailing a block in the angle, and cutting the base against it, is, to say the best of it, a "botch" and should not be tolerated.

From "Draftsman" :—Please inform me of a good method of making erasures in tracings, and oblige ?

ANS.—The most successful plan that we know of for making erasures on tracings and then obliterating the effects of the erasure, is first to use an ink eraser—taking out the lines thoroughly—and then rubbing the tracing with powdered pumice stone. For this use a piece of chamois skin, first sprinkling the cloth with the powdered stone and then rubbing thoroughly with the skin—afterwards blowing off the stone and polishing with the skin along.

From Plasterer :—What is the best method to employ for insuring a good job of rough-casting for outside work ?

ANS.—First, lath over the sheathing—or tarred paper—diagonally with No. 1 pine laths, keeping $1\frac{1}{2}$ inch space between the lath ; nail each lath with five nails and break joints every 18 inches ; over this, lath diagonally in the opposite direction, keeping the same space between the laths and breaking joints as before. Careful and solid nailing is required for this layer of lathing, as the permanency of the work depends to some extent on this portion of it being honestly done. The first coat should consist of rich lime mortar, with a large proportion of cow's hair, and should be mixed at least four days before using. The operator must see to it that the mortar be well pressed into the key or interstices of the lathing to make it hold good. The face of the work must be well scratched to form a key for the second coat which must not be put on before the first scratch coat is dry. The mortar for the second coat is made the same as the first coat and is applied in a similar manner, with the exception that the scratch coat must be well dampened before the second coat is put on, in order to keep the second coat moist and soft until the dash or roughcast is throw on.

The dash, as it is called, is composed of fine gravel, clean, washed from all earthy substances and mixed with pure lime and water till the whole is of a semi-fluid consistency. This is mixed in a shallow tub or pail, and is thrown upon the plastered wall with a wooden float, about 5 or 6 inches square. While the plasterer throws on the roughcast, with the float in his right hand, he holds in his left a common whitewash brush, which he dips in the dash and then brushes over the mortar and roughcast, which gives them, when finished, a regular uniform color and appearance.

For 100 yards of rough-casting, done as above described, the following quantities will be required : 1800 laths, 12 bushels lime, $1\frac{1}{2}$ barrels of best cow's hair, $1\frac{3}{4}$ yards of sand, $\frac{3}{4}$ yards of prepared gravel and 16 pounds of cut lath nails, $1\frac{1}{4}$ inches long. A quarter of a barrel of lime putty should be mixed with every barrel of prepared gravel for the dash. The dash may be colored as desired by using the following pigments :

To color 100 yards in any of the tints named herewith, use the following quantities of ingredients : for a blue-black, 5 pounds of lampblack ; for buff 5 pounds of green copperas, to which add one pound of fresh cow-manure, strained, and mixed with the dash. A fine terra-cotta is made by using 15 pounds of metallic oxide, mixed with 5 pounds of green copperas and 4 pounds of lampblack. Many tints of these colors may be obtained by varying the quantities given. The colors obtained by these methods are permanent ; they do

not fade or change with time or atmosphere variations. Earthy colors, like venetian red and amber, soon fade and have a sickly appearance.

From "W.B.C."—Would you kindly describe the proper way of making a dry earth closet for use in one seat and oblige?

Ans.:—A dry earth closet can easily be made that will answer every purpose as follows:—The receptacle is simply a large drawer so made that it slides easily under the seat. A runway should be made on which the drawer slides, and on the bottom of the drawer screw two hardwood runners the whole length of the drawer which allows the drawer to work out and in without much pulling. The drawer should be made a little shorter than the length of the space in which it is to fit, and a good strong handle should be fastened on at the end next the opening, to pull it out with. A door with hinges and bolts should cover the opening and enclose the drawer. When the drawer requires to be emptied the door is opened, the drawer pulled out and the contents disposed of, and the drawer cleaned out and a layer of dry earth placed in it about three inches deep and the drawer put into its place again, when it is ready for use. It is always better to line the box with galvanized iron, made watertight as wood becomes so full of moisture that it becomes offensive after a time and a new drawer becomes necessary. Dry earth must be at hand all the time, and every time the closet is used a fireshovel full should be thrown in the drawer, and this will effectually deodorize and disinfect any matter deposited in the drawer.

EXPERIMENTS ON THE FLOW OF WATER IN PIPES.

In a paper recently read before the American Society of Civil Engineers, by Augustus V. Saph, Assoc. Am. Soc. C. E., and Ernest W. Schoder, jun., Am. Soc. C. E., the authors show that experiments confirm the law of variation of resistance proportionate to the power 1.75 of the mean velocity. These were for brass pipes of small diameter. The authors find for galvanized pipes a variation proportional to the power 1.90 (about) of the velocity, indicating that the exponent of V varies with the interior surface of pipe. Mr. Flamant, in the discussion, pointed out that it would be interesting to make experiments with pipes of different materials such as glass, earthenware, wood, wrought iron, to ascertain the effect of the surface, or of an interior coating of paint or tar. The experiments made by the authors of the paper also showed the effect of temperature on small pipes. The confirmation of the increase of flow with the temperature for small pipes is of value. Mr. Mills, another authority, observes, "The effect of temperature upon the flow of water in pipes is a valuable addition to our knowledge. The most interesting series of experiments, because it gives the slopes for both high and low temperatures through the greatest range of velocities, is that upon the smallest brass pipe which is about one-tenth of an inch in diameter. With temperatures of water near 70° Fahr., the slope varies nearly with the first power of the velocity, being contained between $S = 0.129 V$ and $S = 0.138 V$ for all velocities given up to $V = 2.309$ ft. per second. Above this velocity the slope increases much more rapidly. Upon reaching a velocity of 3.3 ft.

per second, the slopes come into line with those of higher velocities, which vary with a power of the velocity somewhat less than the second power, being with the very smooth pipe near the 1.75 power . . . with small velocities and the water having the lower temperature has the greater slope, but during the rapid increase that follows, the warm water being less viscous and more mobile, makes this change at smaller velocities than the colder water, and the slope for 75° is greater than the slope for 60°, and both become greater than that for 38.5°." These experiments are useful as showing that the "principal effect of temperature is upon that resistance of motion due to cohesion and adhesion which varies with the first power of this velocity." Many other writers discourse on the subject, which has a practical interest for hydraulicians, though it must be admitted that few large pipes have such smooth surfaces as the small brass ones used in the experiments. It is therefore reasonable to make an allowance for this difference. The experiments also show the uselessness of relying on the formula as applicable to all the conditions found to exist in practice. We refer those interested in the discussion to the report on the Proceedings of the American Society of Civil Engineers for September.

NOTES.

Turpentine may be tested for its purity by dropping a small quantity on a piece of white paper, and then exposing to the air. If the turpentine is pure, no traces will be left, but if oil or other foreign matter is present, the paper will be greasy or soiled.

The oldest brick in existence, dating from the Fortieth Century, B. C., was shown by Mr. Henzey, the keeper of the Louvre, in Paris, to members of the Academie des Inscriptions et Belles-Lettres. This brick was discovered during recent excavations at Tello, in Chaldea, by the French antiquarian De Sarzee. The brick was somewhat curved and had been burned. It bore the marked of the maker's thumb.

To make transparent paints for glass take for a blue pigment, Prussian blue; for red, crimson lake; for yellow, Indian yellow; for brown, burnt sienne; for black, lampblack; and for other shades a mixture of the appropriate colours. Rub them in a size made as follows:—Venice turpentine 2 oz., oil of turpentine 1 oz., and apply with a brush. For temporary purposes, fine and brilliant colours are obtained by dissolving aniline dyes in white shellac varnish; but they are fleeting colours, and do not always pay for the trouble.

A Milwaukee man has recently patented a process for cleaning brick and stone walls with sand and compressed air and has been successfully carrying out the work in Milwaukee on a row of flats opposite the public library. The walls there had been blackened and charred by the smoke of a recent fire. The man in charge of the hose had his head protected by a curious shield, somewhat resembling a diver's equipment. The hose led to a tank on the pavement below, which was connected with a gas engine. After the application of this stream of compressed air and sand the walls were as bright and fresh as if just constructed. An air pressure of about 40 lbs. was maintained.

An excellent working agreement between employers and employees is that in operation at Lincoln, Neb., between carpenters and contractors. It recognizes the right of the employer to hire or discharge any man he wishes and the right of the working man to work for, or decline to work for, anybody. The employer may employ non-union men, but he must pay the union scale. The union men agree to work with non-union men. All strikes and lockouts are barred. Any differences arising between employers and employees are to be settled without the intervention of other trades—in other words, no sympathetic strikes. A joint board of arbitration is provided for. An eight hour day is agreed upon. Both parties agree to exercise a mutual preference for each other in employing or in working. An arbitration system is also provided for.

PLUMBING PRACTICE UP-TO-DATE.*

BY LEWIS LE GROW, TORONTO.

The plumber has always stood for one who works in lead; the name stands for the same to-day, but it has advanced to a position where it not only represents one who works in lead but also one who is responsible for the health of the community more than any other, and as it has been stated that there is nothing new under the sun, plumbing as we find it to-day is a contradiction of that statement.

It is not long since that plumbing was looked upon as the least important part of a house. It was considered quite up-to-date to have a 4-inch tile drain, extending from sewer on street to the most convenient point and then to run branches to different houses without respect to what basements it went through, or how complicated it might be constructed. Once an obstruction occurred in the main drain all properties dependent on it suffered in consequence. To-day every house must have its own drain carried outside of foundation walls.

Light soil pipe was universally used to bath room, then extended with galvanized iron through roof with slip joints. Every fixture in the bath room would be connected into heel or closet bend and it often connected to soil pipe with a putty or rust joint. Then for the finishing of the job, Pan, Hopper or Demerest closet was considered quite a luxury, but on no condition was any part of it to be exposed that might allow the free circulation of pure air, which in the opinion of many was not so important as that everything boxed in and painted so that microbes and other parasites might be the better increase.

With the advance of practical and technical education, laws have been adopted to compel people to appreciate good plumbing. Our improvements have affected all fixtures and condition of work, the most important being our system of backventing and syphon jet closet.

We will briefly notice the most important article of plumbing construction, namely, traps. A great many have been placed on the market, but from experience I find that traps with internal partitions are most dangerous. A flaw may exist in this partition

above the water line and allow gas to enter the house. When we consider that it is not the depth of seal that offers the most resistance to syphonage, but the amount of water and that it is the depth of seal and not the amount of water that offers the greatest resistance to sewer gas, it is very important that the trap should be well made and work on the centrifugal principle with a back vent to relieve the trap from the pressure of sewer gas. The main trap in the sewer in my opinion should not be tolerated; it prevents the ventilating of sewer through the main stack and it also acts as an impediment to the flow of sewerage.

House drains should carry waste out of the house—not much nor little, but all—and do it promptly; when that which is intended for the street sewer is started on its journey it should be afforded a means of reaching its destination at once and without interruption, not a particle of filth should be allowed to cling to the sides of waste pipes nor be held in solution in some trap until it begins to decompose and give off its dangerous gases.

Kitchens of hotels and restaurants should have a grease trap situated in an open place and easy to clean out; all back vents on bath traps should rise perpendicular through the floor and not be bent so low on the trap as would allow any particles of waste matter to accumulate around its opening and stop the free ingress of air. When this occurs there is danger of syphoning. Where vents from traps connect with wrought iron pipes square elbows should not be used, angle fittings are the only perfect connection. Water closets such as the Richelieu and improved Sanitary should not be used on sanitary work owing to the vent being made a part of the trap and crockery is not a safe thing to connect with lead; the vent being rigid, any settling of the floor or movement of the fixtures is likely to break off the vent horn. And to prevent any settlement of soil pipe, it should rest on a foundation of brick or stone properly built by a mason. There are too many stacks of soil pipe connected with the tile drain allowed to rest on a bed of sand supported only with iron hangers. We have all had experiences of a very unpleasant nature from hoar frost accumulating at top of 4-inch soil pipe above roof, stopping the ventilation of fixtures and causing syphonage, allowing sewer gas to saturate the room in a short time. All soil pipe passing through the roof should be increased to 5-inch from underside of same.

Another point of very great importance to the health of the people is the proper construction of a cess pool. It should be so placed that the liquid from it into the surrounding soil may not affect the water supply or leak into the cellar of the house.

(Continued on page 55.)

*Paper read before the Toronto Master Plumbers' Association.

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Contributions of value to the persons in whose interest this journal is published are cordially invited. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

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NOTES.

The specification of the new naval barracks at Chatham, Eng. stated that the floors were to be caulked, and the contractor, entered into a sub-contract for the work. The space between the boarding was said in the contract to be $\frac{3}{8}$ inch. Owing to the shrinkage of the timber this space was increased, and the sub-contractors claimed to have expended 137l. on the additional glue and oakum that was required. The defendants admitted the shrinkage, but maintained that it occurred after the caulking. The jury gave a verdict in favor of plaintiffs, with 118l. damages.

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The improvements of water closets have been remarkable, thanks to our manufacturers and the healthy competition amongst us to introduce to our customers the very best appliances. The syphon water closet takes first place to date. The energy of the flush is exerted without loss under atmospheric pressure; it produces complete syphonage. In the washout closet before the trap is reached much of the energy is wasted. Water closets constructed in basements should be arranged with a due regard to the effects of the sun, for there is no disinfectant so sure as sunlight and ventilation. Local vents should always be connect-

ed directly with the closet bowl to be of the most practical benefit, and where it connects with the chimney it should run into a piece of iron pipe as galvanized iron in time will become rusted.

A great source of trouble in our homes which we fail to be conscious of is the refrigerator. Into it is placed the important things of life and it is surprising how little attention is paid to the proper disposal of the waste water. It should be conducted into an open pan or sink, placed some distance from the end of the waste pipe, with a good air space. This fixture properly trapped and ventilated and supplied with faucet would remove a great source of unpleasantness.

House drainage at the present time consists of two parts, soil and waste pipe above ground and tile drains under ground.

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For each part there are different tradesmen, the plumber taking care of work above ground, the drainmen that below ground. The connection of soil pipe with the system of drainage belongs to the plumber, and he is responsible for the same. This connection has to be made with cement, and the most important of all, for it is covered up and not likely to be seen again until trouble occurs in the drainage. If then it is admitted that iron pipe free from all defects is necessary above ground, is it not of more importance that the same soil pipe should continue uninterrupted to a point outside of the foundation walls.

In this city materials out of which house drains have been constructed have remained the same while other improvements were being made, and it is time that we should take the initiative and have our drainage system placed in a proper position and constructed of material that the first cost will be the only one, and that the interest of men engaged in the manufacture of pipe must take second place to the health of the people. The ordinary tile drains must be discarded since they cannot be secured against breaking and defective joints. Perfect joints and not mere increasers must be used between sections of drains and soil pipes inside of any building. The removal of main traps and the purification of sewer gas that is the most poisonous, namely, sulphurated hydrogen and sulphide of ammonium.

It is not extravagant to talk about a perfect system of drainage since lasting material can be used. There is no more reason why there should be perishable material used and defective joints made in house drains than in the pipes which convey the gas. The latter are air tight and gas tight; so should the former be. House drains should be recognized as a part of a house, not as something that will be covered up and not of so much importance. The supervision and the construction of house drainage should be put under the direction of the responsible and practical plumber, and not as at present, any man who can do it the cheapest.

It appears very simple to those who take no further thought of it that the essential element in plumbing is the ventilation of the sewers, but conditions and details of actions require to be studied, taking into consideration the disregard many people have for the plumbing fraternity, and it will be necessary for us to use scientific knowledge and practical experience to improve the sanitary comforts for all conditions. A united co-operation between the medical, architectural and engineering societies, lead on by our own professional plumbing and heating engineers, might bring the day when we will fully realize that an Omnipotent Providence has placed on us a responsibility of educating the indifferent to an understanding that the highest material things in life are cleanly surroundings and a pure system of ventilation.



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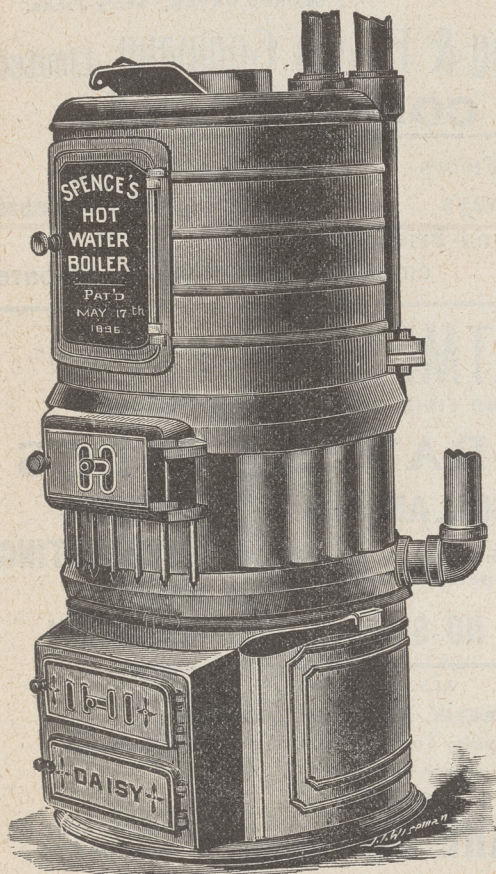
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THE IROQUOIS THEATRE FIRE.

The coroner's jury, after an investigation lasting nearly three weeks, placed the responsibility for this holocaust upon the shoulders of eight city officials and theatre attaches. The mayor of the city, the manager of the theatre, a fire marshal, a building commissioner and a building inspector are included in the list. The causes of the fire are stated as follows :

By the grand drapery coming in contact with an electric flood or arc light situated on an iron platform on the right hand of stage facing the auditorium.

The city laws were not complied with relating to the building ordinances regulating fire alarm boxes, fire apparatus, damper or flues on and over the stage and fly galleries.

We also find a distinct violation of the ordinance governing fireproofing of scenery and all woodwork on or about the stage.

The asbestos curtain was totally destroyed, and was wholly inadequate considering the highly inflammable nature of all stage fittings, and owing to the fact that the same was hung on wooden buttons.

The building ordinances were violated by inclosing aisles on each side of lower boxes and in not having any fire apparatus, dampers or signs designating exits on orchestra floor.

The building ordinances were violated in that section regulating fire apparatus and signs designating exits on dress circle.

The building ordinances were violated in that section regulating fire apparatus and signs designating exits on balcony.

Generally the building is constructed of the best material and is well planned, with the exception of the top balcony, which was built too steep, and therefore difficult for people to get out of, especially in case of an emergency. We also note a serious defect in the wide stairs in the extreme top east entrance leading to the ladies' lavatory and gallery promenade, the same being misleading, many people mistaking this for a regular exit, and going as far as they could, were confronted with a locked door which led to a private stairway, preventing many from escaping and causing the loss of fifty to sixty lives.

It is to be hoped that the officials of Canadian cities will feel their responsibility and not wait for the verdict

of a coroner's jury. What is being done to remedy the defects in theatres and other public buildings in Toronto and elsewhere discovered as the result of visits of inspection made immediately following the disaster in Chicago? The newspapers of Toronto, which remained mum in the face of the statements published in this journal regarding the unsafe condition of one of the Toronto theatres, were forced by the Chicago horror to make a show of defending the public safety, but for weeks past they have not published a line on the subject. The Theatre and Music Halls Committee of the London County Council recommends that all places of amusement should compulsorily be placed in telephonic communication with the fire brigade; not only should this be done, but members of the fire brigade and police force should be detailed to attend every performance. The buildings should be made as nearly fire-proof as possible and so planned as to afford ready egress from all parts of the interior. In addition to all this, some carefully thought out method of preventing a panic should be adopted.

What is called a heat-proof putty is made by mixing burnt lime with linseed oil and boiling down to the usual consistency of putty, and allowing the plastic mass to spread out in a thin layer to dry in a place where it is not reached by the sun. It can be warmed over a lamp or otherwise for use, and on cooling is hard again.

A VISIT TO THE CANADA FOUNDRY COMPANY'S WORKS.

A luncheon was recently tendered at the King Edward Hotel, by Mr. Frederic Nicholls, general manager, on behalf of the Canada Foundry Co., to some two hundred gentlemen prominently identified with the business interests of Toronto. Arrangements had been made to afford these gentlemen the opportunity of inspecting the company's extensive works at Davenport, and special cars were in waiting for the purpose. Unfortunately, however, as the start was about to be made a severe blizzard set in, and it was decided to postpone the visit until a future date, of which due notice will be given.

NEW IDEA IN HOT WATER DISTRIBUTION.

Oscar F. Peterson, of Des Moines, has secured a patent on systems of hot water distribution designed to keep the hot water hot while circulating in the mains, without expensive main construction. He places the hot water pipes in common clay tiling, through which, surrounding the hot water pipes, he forces hot air, which keeps the water in the pipes at the highest possible temperature. It is said that with a 40-horse power engine to pump the water and a 6-horse power engine to run the fan with which the hot air is forced through the tube, the plant can be operated advantageously and at a minimum cost. The air which is used is heated by the waste heat which otherwise would go out the smokestack. The use of the hot air is elementary in reducing cost of production, in two ways: It keeps the hot water hot, thus reducing the fuel required to keep it at 250 degrees, and it does away with the expensive asbestos and wooden lag main construction. Where the water pipes in the ordinary system radiate and lose much heat throughout their length, in the Peterson device it is claimed that it is the hot air which radiates and loses heat instead of the hot water. Mr. Peterson says that he has tried the device in a mile of mains and it worked satisfactorily. On account of the economy of the scheme the heat can be furnished at a much lower price than the heat of other plants, it is claimed.

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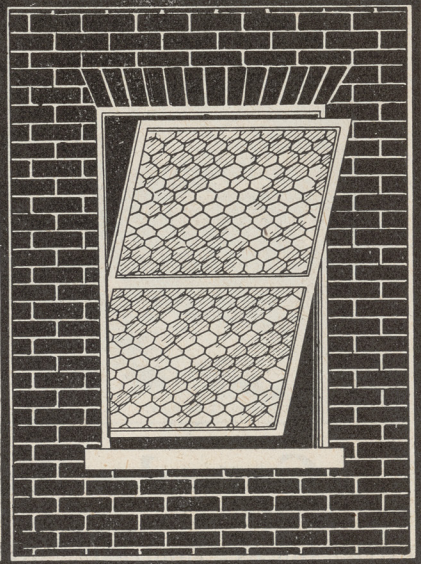
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PERSONAL.

On March 16th Mr. Stewart Percival McMordie, of the firm of Barry & McMordie, Niagara Falls Ont., was married to Miss Edith Mabel Stephens.

Mr. William Graham, a once prominent contractor, died at his house in Galt, Ont., on March 16th, at the advanced age of 86. He was a second cousin of Thomas Carlyle.

Messrs. Robert McCallum, City Architect of Toronto, and A. Chausse, Building Inspector of Montreal, attended the recent convention of the National Building Commissioners and Inspectors' Association at Washington, and were elected vice-presidents of that organization.

BUSINESS NOTES.

The attention of architects and contractors is directed to the card of the Hagersville Quarry appearing for the first time this month in our Stone Dealers' Directory.

The Cement, Stone and Building Co., Toronto, has been incorporated with a capital of \$50,000, to manufacture building materials, builders' supplies, etc. The provisional directors include W. D. McVey, H. H. Thompson and Robt. Taggart, Toronto.

The Manitoba Builders' Supply Co., Winnipeg, Man., has been incorporated with a capital of \$450,000, to manufacture builders' and contractors' supplies, etc. The provisional directors include Wm. J. Hodgins, Robt. Watson and H. J. Macdonald, Winnipeg.

The Montreal Silicate Brick Co., Limited, chartered in the summer of 1902, with an authorized capital of \$100,000, to take over the brickyard and plant of C. Sheppard & Sons, and engage in making bricks by a new patent process, have themselves applied for an order in liquidation.

The Canadian Coral Marble Co., Limited, of Toronto, whose advertisement appears in this number, have issued a handsome brochure explaining the various uses to which their materials are adapted in building construction, such as flooring, paneling, tiling, etc. A number of excellent reproductions of photographs are given showing the materials in situ in the King Edward Hotel, City Hall, and other prominent buildings in Toronto.

NOTES.

The following are the officers elect of the Ottawa Master Plumbers Association for the ensuing year: President, Gil Julien; 1st Vice-President, D. O'Connor; 2nd Vice-President, A. Langelier; Treasurer, Wm. Northwood; Secretary, T. Blyth; Sanitary Committee, J. Livock, J. R. McLennan, J. McKinley, Mr. Martel, Mr. Normand; Auditors, C. Watt, H. A. Knox; Tyler, P. I. Bois.

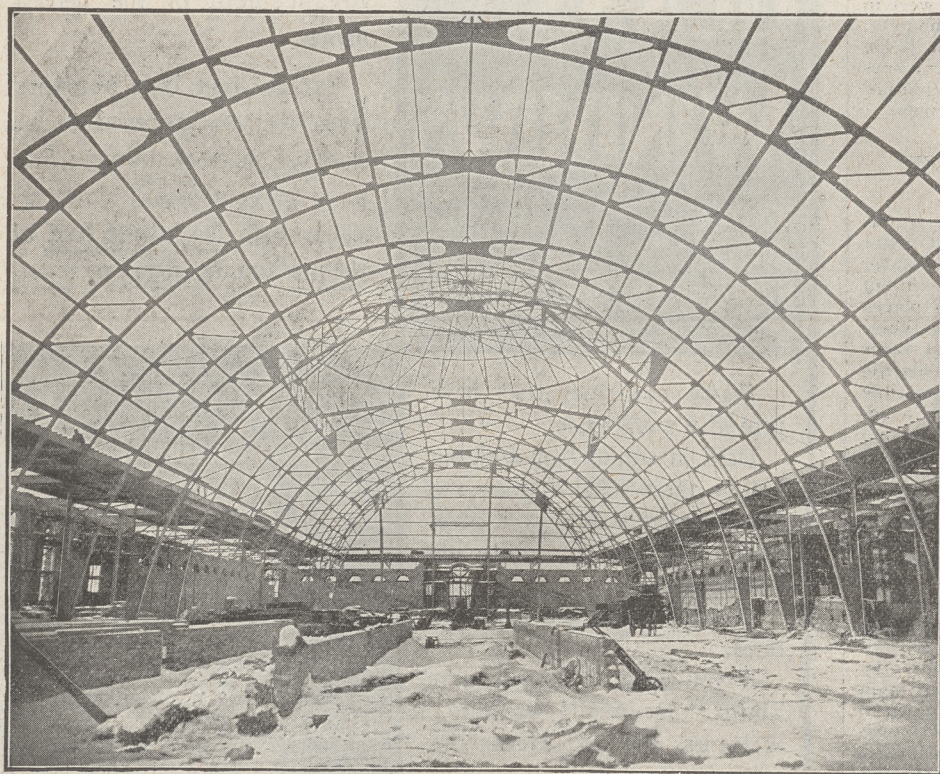
The electric wiring of the Tooting Bec asylum for aged imbeciles in London, England, is carried through brass conduits which are made to act as the return conductor as well as a protecting channel. One insulated conductor is run within each tube (or two where the three-wire system is employed) and the tubes are 5/16 to 7/16 inch in diameter. The conduits are, of course, grounded to prevent shocks.

There is reported to be a movement of foot among the owners of lumber yards and wood working factories in Vancouver to sell through one central office at agreed prices and apportion the sales among the different firms. As a result the builders are anticipating an all round advance in prices of lumber and wood finishings. They threaten to import their materials from Puget Sound if the combine should squeeze them too hard.

The following gentlemen have been elected as officers of the Montreal Master Painters' Association: President, C. T. Charlebois; First Vice-President, W. P. Scott; Second Vice-President, T. A. Gauthier; Joint Recording Secretaries, L. Z. Mathieu, Chris. Sonne; Corresponding Secretary, S. N. Arcand; Treasurer, A. Girard; Executive Committee, Wm. Young, convenor; R. E. Jones, P. Houle, Wm. T. Castle; Arbitration Committee, the President, W. P. Scott, John Murphy, W. T. Castle, J. N. Arcand.

The effect of low temperature on iron has recently been investigated by Professor Dewar and Mr. Hadfield, using a bar containing 99.89 per cent. of iron, which is practically pure. Tests at ordinary temperatures showed a tensile strength of 21 tons and an elongation of 25 per cent. in 2 inches. At a temperature of -180 degrees Cent. the tensile strength was increased to 54 tons, but the elongation was nil. The part of the bar that had been subjected to extremely low temperature bent double cold after it had returned to the normal temperature.

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NOTES.

The revival in England of glass painting, which at one period threatened to become a lost art, has, during the past forty years, made such progressive strides as to mark a new epoch in the art work of Great Britain.

"Look here!" cried the victim, "you said that house was just a stone's throw from the station." "Well?" enquired the real estate agent. "Well, the distance is half a mile at least." "Is that all? Time and again I've seen a blast in a quarry that would throw stones upwards of a mile."—Philadelphia Press.

"Fire Marks" of fire insurance companies are conspicuous objects in London houses and recall the old days when only such buildings as were so distinguished from those not so "adorned" were entitled to the services of the firemen in case of a fire. These badges consist of embossed leaden plates, which originally were colored gilt, and bore on them the distinctive sign of some particular insurance office, often with the number of the policy added. Some are very curious, and are being carefully preserved by the London county council to form part of the

contents of a future municipal museum. Quite a number have recently been taken off from the walls of some old houses that have just been removed in the clearance made for the new thoroughfare from Holborn to the Strand.

A short time since, the side wall in a large building in a western city bulged so far out of line that the authorities intervened and a total collapse of the structure was looked for. The difficulty was remedied by connecting the two opposite walls across the building at short intervals by two-inch rods with nuts and heavy washers on the ends. Alternate rods were heated and the expansion taken up by turning in the nuts. Then as the wall was drawn in by the contraction of the iron on cooling, the remaining bolts were heated, and in their turn tightened, and the process repeated until a bulge of some eight or ten inches was effectually counteracted. This process is an excellent one when it is carried out intelligently. But we remember one occasion on which the same system was tried, but the strain on the rods was so great that, though they expanded with the heat, they were simply pulled out again under the contraction, and it was the rods instead of the brickwork which gave way.

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FURNISHINGS OF THE BRITISH BUILDING AT THE
WORLD'S FAIR.

The finishings and furnishings of the interior of the British Building at the World's Fair are in keeping with the grandeur of the royal rooms they represent. The Banqueting Hall is a reproduction of the Orangery at Kensington Palace. The ceiling is enriched with the Royal Arms and festooned mouldings of fruit and flowers. The furniture of this room comprises faithful reproductions of historical examples of the Queen Anne period. The old Console tables were part of the collection at Mertham House. The chairs are reproduced from the originals in the possession of the Earl of Westmoreland. The brass chandeliers are based upon fine old examples. Next to the Banqueting Hall is a fine suite of rooms designed in the English styles.

The Elizabethan Room has an ornamental ceiling which is copied from the breakfast room in that historical mansion, Holland House, Kensington, in the decoration of which the best artists of the day were employed, and whose many famous occupiers included the Earl of Holland, William Penn, and Vandyke, the celebrated artist. The chimney piece, paneling and plaster frieze are taken from Bromley Palace. The furniture is of the same period, the small cabinet being a copy of one dated 1621, formerly belonging to Archbishop Sharpe and now in the possession of Sir William Sterling Maxwell, Bart. The

old armour was formerly in the collection of the late Earl of Egmont, Cowdray, Sussex.

The Georgian Room, with white enriched paneling and mahogany doors, is a fine specimen of English work reproduced from an old house at Epsom, Surrey.

The Adams Room, with its enriched plaster ceiling, frieze and doorways, is taken from examples designed by the celebrated architects, Robert and James Adams, in the latter part of the eighteenth century.

The large room (Queen Anne) is designed in the style of Sir Christopher Wren, the details being taken from Hampton Court Palace, and Belton House, where Grinling Gibbons executed some of his best wood carving under Sir Christopher's direction. The furniture is from old examples. The original chair came from the collection of Viscount Hilton, at Merstham House. The settee was prepared for Queen Anne's reception at Forde Abbey. The cabinet is an old one, procured from an ancient county family who have handed it down for generations.

The Ontario Wind and Tornado Mutual Insurance Company will apply to the Ontario Government for incorporation to carry on the business of insurance against loss or damage to property caused by storms, wind and tornadoes.

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FINISHED LIKE A MIRROR. Your white Velure is the best we ever tried on the Yachts. Two coats really finished like a mirror. It far surpassed any enamel or ivory japan we ever used. I have done all the Windows in the house with it. HUGH DORRIAN, Yacht Builder. Nunsquarter, Kirkcubbin, Co. Down, June 24, 1901.		ARCHITECT. I am exceedingly pleased with the result of the Velure I had last year. Our doors look and feel like ivory, and show every appearance of great durability. I find that they keep very clean, and do not take the dirt. A. E. PURDIE, F.R.I.B.A. Meadow Grange, Blean, near Canterbury, Jan. 2, 1902.	
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